

## A CASE OF PERSISTENT VITALITY IN SEEDS.

By BURNET LANDRETH.

(Read January 19, 1906.)

Mr. Watson, Curator Royal Botanic Gardens of Kew, published in the *Gardeners' Chronicle* of the eleventh of February, 1905, his opinion that seeds hermetically sealed were injured in vitality. No doubt he is correct to a degree, but commercially he is wrong, as those merchants practically engaged in shipping seeds through, or to, damp climates, as via the Suez Canal to India, have had just the opposite experience as compared with seeds not hermetically sealed.

The advantage of air-tight containers for the transportation through, or the keeping of seeds, in tropical countries, has also been proven nearer home, as, not only in Central America and Mexico, but in our own states bordering on the Gulf of Mexico, where it is well known that seeds not hermetically sealed will lose 50 per cent. to 60 per cent., and even 70 per cent., of vitality in a single summer; in the language of the southern seedsman, "they sweat to death."

But just here is a novel record as respects exposed seeds in a dry and arctic climate, an incident without any paralleling features as to a prolongation of vitality.

The seeds referred to, if kept at Bloomsdale Farm, where they were grown, through the period of sixteen years, would not have possessed any vitality, while in this case, under a continuously low temperature, one of the two varieties saved, the radish, grew up to 50 per cent. upon being returned to the United States; this, I infer, from the complete arresting of transpiration in the dry and cold atmosphere of the very far north.

This is a record of scientific interest, a contribution to the store of vegetable physiology, a demonstration never before attainable, and not likely ever again to be repeated. It is, and will remain, unique.

The following is the statement of Dr. Dedrick of the Peary Expedition of 1901:

“ WASHINGTON, NEW JERSEY,

“ 15th November, 1905.

“ MR. BURNET LANDRETH,

“ *Dear Sir:*—The incidents of the finding of certain seeds abandoned by Lieutenant Greely at Fort Conger, 490 miles from the pole, were as follows:

“ In January, 1899, the expedition of Lieutenant Peary, of which I was surgeon, discovered Fort Conger,  $81^{\circ} 44'$ , or about 490 miles from the pole. This station was abandoned in 1883, sixteen years, and among the articles reclaimed by the Peary party were a lot of seeds in packages bearing your name. These seeds were sealed up in the usual flat paper packets as issued by your establishment (I send you some of the identical seed packets) and were found in an open box in the loft or attic of Fort Conger, where they had rested sixteen years, well sheltered from rain and snow, but exposed to a winter temperature of  $60^{\circ}$  to  $70^{\circ}$  below zero.

“ In April, 1899, with the seeds in my possession, we journeyed by sledge over the ice some 300 miles south to our ship, from whence I sent the seeds home that season, where they remained unplanted until the spring of 1905.

“ The seeds from two of these packets, one of lettuce and one of radish, I planted in my garden at Washington, New Jersey. The lettuce seed failed entirely to germinate, but about one half of the radish seeds germinated and reached perfection in size, and even reproduced seed. The photograph which I enclose was taken from one of the roots, grown during the summer of 1905, after it had reached full development, and the seeds sent you are the produce of the same roots.

“ This retention of germinative force, under the conditions of sixteen winters of exceedingly low temperature (we found it  $70^{\circ}$  below zero at Fort Conger) and during the five years subsequently when brought back to the United States, twenty-one years in the total, is to me most extraordinary, and this record is another added to the many valuable contributions to science made by Lieutenant Peary's four years' expedition.

“ THOMAS S. DEDRICK, M.D.”

Explanatory of the taking of the seeds to the far north, is the

following letter from General A. W. Greely, now Chief Signal Officer of the Army:

“WAR DEPARTMENT,  
“WASHINGTON, D. C.,  
“October 23, 1905.

“MR. BURNET LANDRETH, Bristol, Pennsylvania.

“*Dear Sir:*—Referring to your letter of October 21, I have to state that I took north with me in 1881, in connection with the Lady Franklin Bay Expedition, various seeds. It is my impression, although I am not certain on this point, that they came from your own seed farm. Attempts were made at Fort Conger, 81° 44' north, 64° 45' west, to raise crops of lettuce, cabbage, radish, etc., with the desire of adding fresh vegetables to the dietary of the expedition, for their antiscorbutic qualities.

“Despite considerable care these efforts were not successful, the general opinion being that the soil was too strongly saturated with alkalis to suit these crops.

“Judging from the experience of my own expedition, the seeds which were brought back by Surgeon Thomas Dedrick must have been subjected nearly every winter since 1883 to temperatures of 60° below zero, Fahrenheit, and probably during the summer to temperatures approximating 60° above zero, Fahrenheit.

“Yours truly,  
“A. W. GREELY.”

No seeds, so far as on record, ever had such a prolonged or severe test as to their vitality as these which Lieutenant Greely took to the very far north, seeds which laid at Camp Conger, with other abandoned property, for sixteen years, or until 1899, when the north polar expedition under Lieutenant Peary found the camp.

Experiments in the laboratory have been made by exposing seeds to the influences of liquid air in temperatures 40° and 50° below zero, but never has the opportunity existed, and possibly there never will, to reclaim seeds after seventeen years' exposure to an arctic temperature every winter of 60° below zero.

The following are some extracts upon the subject of the retention of germinative force of radish seeds:

1. From the Seed Division of the United States Department of Agriculture: "We have not conducted any experiments along these lines."

2. From the Seed Division of Cornell University: "Our director of twenty years ago, Dr. Sturtevant, made some experiments to determine the longevity of radish seeds, and reported that starting with one-year-old seed at 71 per cent., it was at two years 57 per cent., at three years 49 per cent., at five years 37 per cent., six years 12 per cent., seven years 3 per cent., twelve years 0 per cent."

3. From the Department of Agriculture, Ottawa, Ontario: "We have no experiments to report. Our observations are that a dry cold atmosphere has little or no influence upon northern-grown seed. The effect of cold depends upon the amount of moisture surrounding the embryo. Northern-grown glutinous wheats are very resistant to cold."

The summary of these communications, and many others, being to the effect that never before has been presented any similar opportunity under which can be observed the effect of intensely low and prolonged cold as preserving and greatly extending the germinative force of seeds. These seeds certainly were harvested the summer of 1880 or earlier, consequently were twenty-three years old when the crop was grown. Just here the thought occurs to me, can it be possible that the electrically charged atmosphere, so constant in far northern regions, has the effect of prolonging germinative force. All arctic explorers observe that the atmospheric electric currents add quite one hundred per cent. to the rapidity of plant growth, and to the development of a miraculous brilliancy of color and strength of perfume.

BRISTOL, PENN.